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Forest Research Note

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ROOTING GREENWOOD CUTTINGS OF YELLOW BIRCH

Yellow birch (*Betula alleghaniensis* Britton) is one of the commercially important species now under study in the hardwood tree-improvement program at our Research center at Burlington, Vt. A preliminary step in this program is to acquire information about vegetative propagation.

There is a complete lack of information about the rooting of yellow birch cuttings. Neither Doran[1] nor Thimann and Behnke-Rogers[2] in their comprehensive reviews of rooting woody cuttings make any mention of work done on this species.

This is a report of an exploratory study to determine: (1) whether a substantial proportion of greenwood cuttings of yellow birch would root under favorable conditions; and, if so, (2) whether rooting is strongly related to age of the parent tree.

Materials and Methods

One hundred greenwood cuttings, 4 to 5 inches long, were taken from each of 6 yellow birch trees on July 21 and 22, 1959. Age of the trees at breast height ranged from 11 to 84 years (table 1).

All except the terminal 3 or 4 leaves were removed from each cutting; male catkins, present on many of them, also were removed. The base of each cutting was wounded by slicing off a thin, 1-inch-long strip of

[1] Doran, William L. Propagation of woody plants by cuttings. Mass. Agr. Expt. Sta. Bul. 491, 99 pp., illus., 1957.

[2] Thimann, K. V., and J. Behnke-Rogers. The use of auxins in rooting woody cuttings. Maria Moors Cabot Found. Pub. 1, Harvard Forest, Petersham, Mass. 344 pp., illus., 1950.

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Table 1.--Number of yellow birch cuttings rooted, by age of parent tree

Age of parent tree (years)	Cuttings tested	Cuttings rooted
	No.	No.
11	100	27
18	100	7
25	100	56
45	100	63
55	100	22
84	100	29

phloem from two opposite sides. The cuttings were then dipped in Hormodin No. 3, a commercial preparation used to stimulate root development, and were placed at a depth of 1½ to 2 inches in a rooting medium of perlite. The spacing was 2 by 3 inches.

Cuttings were kept moist during July and August by an electrically controlled overhead, intermittent mist system. Twice each week all cuttings were given foliar applications of a commercial plant food mixed with a wetting agent.[3] Normal day length was extended by use of overhead incandescent lamps from 9:00 p.m. until midnight.

Cuttings were scored for rooting during the period October 15-21. They were then potted, and the pots were packed in sawdust in flats. After the cuttings had hardened off a few weeks, the flats were covered with 8 to 10 inches of hardwood leaves and enclosed with hardware cloth. A thermograph was installed to measure temperatures above the leaf mulch and at root level 2½ to 3 inches below the soil level in the pots.

Results and Discussion

Roots developed on 7 to 63 percent of the cuttings among the six individual tree collections (table 1); the average for all cuttings was 34 percent. Cuttings that died after producing a few roots were not included in the above figures. Most of the cuttings that rooted developed clusters of fairly strong, branching roots up to 4 inches in length. Thus, it was demonstrated that yellow birch cuttings can be rooted with a moderate degree of success.

The percentage of rooting success showed no discernible relationship to age of parent tree (table 1). Of course data from only 6 trees do

[3]Rapid-Gro plant food, mixed by adding 6 heaping teaspoonfuls to 1 gallon of water, with 3 or 4 drops of Tween wetting agent added.

not rule out possible effects of tree age. But they do indicate that, if there is a relationship, it is not strongly and consistently expressed.

As has been found in attempting to grow sugar maple from cuttings, formation of roots in the rooting bed does not assure successful propagation.[4] The crucial hurdle with both species is successful over-wintering. Fewer than 5 percent of the 204 rooted yellow birch cuttings survived the winter, and these all died soon after breaking dormancy.

Reasons for the failure have not been positively determined, but they do not seem to lie in unfavorable temperatures. The hygrothermograph record showed that winter temperatures at the root level of the mulched yellow birch cuttings held, with mild fluctuations, around 32°F.

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[4] Gabriel, William J., Marvin, James W., and Taylor, Fred H. Rooting of greenwood cuttings of sugar maple: effect of clone and medium. Northeast. Forest Expt. Sta., Sta. Paper 144, 14 pp., illus., 1961.